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This is the author's manuscript

Original Citation:

Availability:

This version is available <http://hdl.handle.net/2318/1686775> since 2019-01-14T12:51:42Z

Publisher:

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(Article begins on next page)

The Surfaces for the Promotion of Biodiversity as an effective political tool to preserve plant diversity in the permanent grasslands of the southern Swiss Alps

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Introduction: In the last years, the Swiss Agricultural Policy has incentivized the establishment of a minimum proportion of permanent grassland areas called ‘Surfaces for the Promotion of Biodiversity’ (SPB). The SPB give right to direct payments to farmers but they need to be managed extensively and according to specific rules (e.g. number of annual mowings, mowing or grazing after established dates). Based on a large dataset of meadows located in the Southern Alps (Canton Ticino), we compared plant diversity between grasslands that had been exploited for several years as SPB or conventionally managed grasslands (CMG), in order to evaluate if SPB have been effective in preserving permanent grassland biodiversity.

Materials and methods: We carried out 242 vegetation transects with the vertical point-quadrat method (Daget and Poissonet 1971), among which 64 on SPB and 178 on CMG. For each transect, species richness, Shannon diversity index, and the number of species belonging to different functional groups were assessed. Independent samples t-tests were carried out to detect significant differences between SPB and CMG. Vegetation transects were classified into vegetation communities by cluster analysis and a Pearson χ^2 was used to test if the proportion of SPB and CMG was similar in different vegetation communities. An indicator species analysis was run to identify specific plant species associated to SPB and CMG.

Results: A total of 389 plant species and six main vegetation communities were identified. Significant differences in the proportion of SPB and CMG within different vegetation communities were found, with a higher proportion of SPB associated to *Festuca gr. rubra* and *Brachypodium rupestre* dominated communities. On the whole, SPB were located at higher and steeper locations and hosted a higher plant diversity (both species richness and Shannon index). Moreover, a higher number of typical forest, fringe, high-elevation grassland, and dry grassland species was detected within SPB than in CMG. Conversely, the number of species typical of nutrient-rich and mesophile grasslands did not differ between SPB and CMG. The indicator species analysis identified 20 species significantly associated with transects on CMG and 112 with SPB, among which some rare species of the Swiss flora.

Conclusion: Based on our results, SPB proved to be an effective policy and management tool to preserve permanent grassland biodiversity.

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